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ARTICLE

EDUCATIONAL MEDIATION IN A NON-FORMAL EDUCATION ACTIVITY: AN ANALYSIS FROM THE PERSPECTIVE OF SALOMON AND PERKINS (1998)

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ABSTRACT: Non-formal education is carried out outside school, in environments where educational actions take place and where the figure of the mediator is important in the learning process. He is responsible, under supervision, for the preparation of activities, participating in the construction of knowledge. However, it is known that in these activities there are obstacles to mediation. Based on the Vygotskian perspective of mediated learning and on the proposal of mediation by Salomon and Perkins, the aim of this work was to analyze aspects of the mediation of monitors of a non-formal activity, how they identify their role and how mediation occurs. For that, the research, of qualitative nature, was carried out in two stages and two instruments of data collection were used: electronic questionnaires and semi-structured interviews. The results show that mediators are far from the idea of mediation and its role, and that they need specific training for their performance.
Keywords: Non-formal education. Mediation. Mediators.

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A MEDIAÇÃO EDUCATIVA EM UMA ATIVIDADE DE EDUCAÇÃO NÃO FORMAL: UMA ANÁLISE SOB A PERSPECTIVA DE SALOMON E PERKINS (1998)

RESUMO: A educação não formal é realizada fora da escola, em ambientes nos quais ocorrem ações educativas e onde a figura do mediador é importante no processo de aprendizagem. Ele é responsável, sob supervisão, pela elaboração das atividades, participando da construção de conhecimento. Entretanto, sabe-se que nestas atividades existem obstáculos para que a mediação aconteça. Baseada na perspectiva Vygotskyana de aprendizagem mediada, e na proposta de mediação de Salomon e Perkins, o

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objetivo deste trabalho foi analisar aspectos da mediação de monitores de uma atividade não formal, como identificam seu papel e como a mediação ocorre. Para tanto, a pesquisa, de cunho qualitativo, foi realizada em duas etapas e utilizou dois instrumentos de coleta de dados: questionários eletrônicos e entrevistas semiestruturadas. Os resultados mostram que os mediadores estão longe da ideia de mediação e do seu papel, e que necessitam de formação específica para sua atuação.
Palavras-chave: Educação não formal. Mediação. Mediadores.

MEDIACIÓN EDUCATIVA EN UNA ACTIVIDAD DE EDUCACIÓN NO FORMAL: UN ANÁLISIS DESDE LA PERSPECTIVA DE SALOMON Y PERKINS (1998)

RESUMEN: La educación no formal se lleva a cabo fuera de la escuela, en entornos donde ocurren acciones educativas y donde la figura del mediador es importante en el proceso de aprendizaje. Él es responsable, bajo supervisión, de la elaboración de actividades, participando en la construcción del conocimiento. Sin embargo, se sabe que en estas actividades hay obstáculos para que ocurra la mediación. Basado en la perspectiva vygotskiana del aprendizaje mediado, y en la propuesta de mediación de Salomon y Perkins, el objetivo de este trabajo fue analizar aspectos de la mediación de los monitores de una actividad no formal, cómo identifican su papel y cómo ocurre la mediación. Para ello, la investigación, de carácter cualitativo, se realizó en dos etapas y utilizó dos instrumentos de recolección de datos: cuestionarios electrónicos y entrevistas semiestructuradas. Los resultados muestran que los mediadores están lejos de la idea de la mediación y su papel, y que necesitan capacitación específica para su actuación.
Palabras clave: Educación no formal. Mediación. Mediadores.

INTRODUCTION

The need for a the population to be scientifically literate extends to the present day. This need arose due to the necessity of debating the countless advances brought to society by science and technology, and the problems that are a consequence of them – such as environmental degradation and the poor distribution of science products (ROCHA; TÉRAN, 2010).

In this scenario, many other spaces for the production of scientific knowledge emerged, and since then, museums, zoos, and science centers have taken on the responsibility of the scientific education of the population. Thus, learning occurs in different spaces, referred to by the literature as spaces of formal, non-formal, and informal education (MARANDINO, 2009; CAZELLI, 2005).

Importantly, formal space refers to a place where the education carried out is formalized, guaranteed by law, related to the Basic Education School Institutions, and defined, in the case of Brazil, in Law 9394/96 on the Guidelines and Bases of National Education. This place of formal education is the school, with all its facilities (JACOBUCCI, 2008). On the other hand, the terms non-formal and informal education emerged in the late 1960s, namely education outside the school environment. Although extra-school activities already received attention, the new nomenclature strengthened this way of teaching (LA BELLE, 1982).

Currently, there is a discussion regarding the definition of these terms. Understanding that there is no single and delimited definition, in this study, we use the one of Vieira (2005) for non-formal education: "organized and systematic education outside the formal teaching environment; it occurs when there is an intention, by certain individuals, to create or pursue certain objectives outside the school institution" (VIEIRA, 2005, p. 03).

With a focus on non-formal education spaces, it is crucial to identify the different scenarios and intentions of their activities. Some areas have regulations and responsible technical team qualified for receiving visitors to learn about the research, take guided tours, and, in many cases, interact with the exposed material, as is the case of museums, ecological parks, botanical gardens, aquariums, zoos, and research institutions. There are also natural or urban environments, which do not have this institutional structure, where educational practices are also adopted. These places include theaters, parks, squares, beaches, and cinemas, among many other locations (JACOBUCCI, 2008). It is crucial to highlight the pedagogical intentionality of these spaces, since, for example, there are parks with and without this intention. In the case of parks and botanical gardens, in addition to environmental education and preservation activities, visitors often participate in experiences that arouse curiosity and encourage contemplation and reflection in the natural environment.

There is a brief discussion concerning formal teaching spaces that, in specific activities, become non-formal. This is the case of university extension projects that, at certain times, receive the external community members at the university laboratories for activities that promote scientific learning and dissemination. These activities include workshops and visits to the university's facilities.

Research involving university extensionist activities is significant as we are in the process of inserting these activities into the undergraduate curricula.

This process is not new since the National Education Plan (PNE 2001-2010) determined that 10% of the credits required for undergraduate courses should consist of extension actions (GADOTTI, 2017).

In the 2014-2023 PNE (Law 13005/2014), this obligation, which proposes to meet the national public policies, reappears in Strategy 12.7, which make up goal 12, ensuring "at least ten percent (10%) of the total curricular credits required for undergraduate education in university extension programs and projects, prioritizing its action towards areas of great social relevance" (BRASIL, 2014). It is possible to observe, between the first and the second PNE, an essential advance between the view of university extensionist activities. The second PNE already supports a more common and emancipatory view, placing the action in areas of social importance as a priority (GADOTTI, 2017).

Another factor that makes this discussion important is the fact that the university extensionist activity is one of the pillars of the university, and the work carried out by the mediators is part of an interdisciplinary extensionist action aimed at the social transformation of students participating in the New Talents Project. Extensionist actions of this nature are of great importance in the training of undergraduate students. For the external community, i.e., the students participating in these actions, the university environment becomes a non-formal teaching space. This space plays a vital role in bringing the external community closer to the academic environment and undergraduate students, inserting primary education for students in the scientific environment and allowing for other paths to scientific literacy.

1. MEDIATOR AND MEDIATION IN NON-FORMAL EDUCATION SPACES

In non-formal education spaces, there is a significant character in the performance of activities: the monitor. In this study, we refer to them as mediators, but depending on their role and the objective of each space, they can have different names. Their presence in non-formal education spaces is already established (MASSARANI, 2007; SILVA; OLIVEIRA, 2011).

Under supervision, they are usually responsible for preparing materials, presenting instructions, and mediating visits. In some cases, the visit fails to promote the expected learning unless the mediator is present; thus, these individuals are a significant link between the activity, the visitor, and the construction of knowledge.

The mediator's actions also vary according to the activity and the institution in which they operate. There are spaces where, in addition to the mediating visits, the mediating monitors prepare exhibitions, produce didactic material, give lectures and workshops, put on plays, and promote trails and other activities (SILVA; OLIVEIRA, 2011). In their performance, the mediator must go beyond the scientific content and learn about the social and human aspects of science, and how they reflect in daily life. It is also necessary to express oneself clearly and correctly, to avoid professorial attitudes, to infer previous knowledge, to measure the contents, to stimulate curiosity, and conduct a reflective and interactive dialogue with the public while promoting the construction of knowledge (MATSUURA, 2007).

Gaspar (1993) relies on Vygotsky's theories when explaining that the mediator must be the most capable character in the social interactions that occur

spontaneously and, when prioritizing the interaction, "speak less and listen more; ask less and answer more; to be less concerned with the rigor of the concepts issued and more concerned with the ability to understand these concepts" (GASPAR, 1993, p. 183-184). Therefore, in a non-formal education activity, the monitor acts by mediating the construction of knowledge, prepares the content, and presents it attractively, helping the participants to understand the presentation. The monitor also focuses on the participant, uses their speech to motivate them, and prioritizes dialogue and the construction of knowledge.

Now, it is necessary to understand the concept of mediation. In the Vygotskyan perspective (1988), mediation refers to the intervention of an intermediate element in a relationship, which is no longer direct and becomes mediated by this interlocutor. It is a fundamental process to enable interaction between the individual and their environment.

Vygotsky states that humans develop in the social environment, and the superior mental processes of individuals (thought, language, and volitional behavior – that is, behavior that comes from the will) originates in social processes. These mental processes are developed and mediated by instruments and signs built into the individuals' social, historical, and cultural environments.

According to Moreira (2009), for Vygotsky, cognitive development cannot be understood without a reference to the social and cultural context. However, it is more than a matter of considering the social environment as an essential variable in mental processes. In the Vygotskyan perspective, cognitive development is characterized as social relations converted into mental functions. Thus, through socialization, we can develop more complex mental processes. They are designed in the student's relationship with their environment, and not the other way around (MOREIRA, 2009).

In non-formal education and mediated activities, this development is primarily provided by the mediator's action who promote socialization among and with the students. In cases where activities are proposed collectively, the mediator's task is to bridge the gap between what the participant is experiencing in the socialization process and the new knowledge, whether through pre-prepared activities, responses to participants, or by instigating students to participate.

Regarding cognitive development, Vygotsky calls the Zone of Proximal Development (ZPD) the distance between the individual's actual level (what they already know) and their potential level (functions that still need further development) (MOREIRA, 1999). The ZPD defines the cognitive functions that are still in the maturation process, is a measure of the learning potential, and represents a dynamic region in which cognitive development occurs.

By considering Vygotsky's (2003) theory, we consider the monitors as necessary mediators. In the social interaction that characterizes teaching, they are the characters who have already internalized socially shared meanings, and who organize and control the environment in which the interactions with participants take place. Socialization is the authentic level of the educational process, and the role of the monitor is to mediate it. We should note that the mediator is also a part of this process, and they use their mediation work so that the potential development of students becomes the new reality.

Still, socialization may not be identical for everyone, since students from different school levels may be included in an activity. One of the critical functions of the monitor is to make mediate between the different types of students. Individuals convert what they learn in social relationships into psychological functions through mediation, which, according to Vygotsky, is typical of human cognition. Activities are internalized through mediated actions (GARTON, 1992).

After presenting the theoretical framework regarding learning mediated through socialization, according to Vygotsky's perspective, we propose a relationship with the mediating action perspective brought by Salomon and Perkins (1998). While Vygotsky presents how learning occurs collectively, these authors present the types of social mediation that can occur in the socialization process of individuals.

2. SALOMON AND PERKINS' MEDIATION PROPOSAL

Salomon and Perkins adopted a unifying information-processing perspective on learning that allows us to describe, compare, and contrast different views of learning. According to the authors, "the idea of information processing includes no biasing presumptions about where those processes lie or what entity they serve" (SALOMON; PERKINS, 1998, p. 3).

The information processes occur within the mind of an individual (the entity learning) or within complex webs of social interaction (the social entity learning could be a team, a corporation, or a loose group of individuals). "In any case, information is being processed, and learning and forgetting occur in the sense that lasting changes resulting from the processing— whether "in" the individual or "in" a social entity—can be identified" (SALOMON; PERKINS, 1998, p. 3).

The individual mediation (IM) describes the conception of the individual learner, emphasizing the acquisition of knowledge and cognitive skill as transferable commodities (SALOMON; PERKINS, 1998). Salomon and Perkins (1998) propose two categories of individual mediation: learning to be a social apprentice and learning social content. These two categories do not fit the objectives of this analysis, as they deal with individual learning; instead, they approach what is learned differently from the Vygotskian perspective presented in this study.

Social mediation (SM) is the sociocultural conception of learning in which active knowledge construction can be a collective participatory process that emphasizes student context, social interaction, and situatedness. That could be the one that conception situative participatory learning (SALOMON; PERKINS, 1998). The social mediation presented by the authors consists of four categories that we present below.

The first category (active social mediation) reflects studies on cognitive development, mentoring, collaborative, and reciprocal learning, etc. The second category emphasizes participatory learning. The third category deals with the role of the mediator and the tools used in the learning process, and the last category approaches learning involving groups such as teams and other organizations.

Subsequently, we detail the four categories of social mediation proposed by Salomon and Perkins (1998).

2.1. ACTIVE SOCIAL MEDIATION OF INDIVIDUAL LEARNING

One of the most fundamentally social forms of learning in human society is that one in which an individual learns from a person or a team. For example, a teacher who teaches biology or chemistry or a master who guides his/her apprentices. In such cases,

> […] the facilitating agent and the primary learner form a joint learning system, with the former helping the latter to achieve critical conditions of learning. For instance, the agent may provide information in the form of instruction or demonstrations, informative feedback about what is right or wrong and what to do instead, approachable but challenging tasks, encouragement, scaffolding of the learner's performance as it unfolds with tips and hints, and so on (SALOMON; PERKINS, 1998. p. 4).

In this proposal, the subject of mediation is the teacher or monitor, that is, the person responsible for mediation. It is not about the transmission of specific knowledge, but rather about the mediator understanding himself or herself as the subject who mediates that knowledge and enables mediation. The teacher's role is to help the students advance and learn new activities that, alone, they would not be able to achieve (MOREIRA, 2009).

In the case of a non-formal education activity carried out by mediators, this is the most common type of mediation. The teachers are responsible for mediation when they present content within the workshops, guide some practical activity and guide the planning of the monitor team. In this case, they are creating a learning system for the student and facilitating learning.

2.2. SOCIAL MEDIATION AS PARTICIPATORY KNOWLEDGE CONSTRUCTION

In the previous topic, there is a distinction between individuals and social agents which facilitate learning. However, there is a second type of social mediation: a social and cultural learning, which definies learning less as the socially facilitated acquisition of knowledge and skill and more as a matter of participation in a social process of knowledge construction (SALOMON; PERKINS, 1998). The examples can be the same: individual mentoring, group problem solving, and collaborative learning, but the way they are understood in this second version is different.

On this second version, social mediation and the individual involved are seen as an integrated system in which the interaction serves as the socially shared vehicles of thought (SALOMON; PERKINS, 1998). According to the authors, "the learning products of this system, jointly constructed as they are, are distributed over the entire social system rather than possessed by the participating individual" (p.5).

In this proposal, we understand that there are two subjects responsible for mediation: the teacher and the student. The teacher develops activities in which they are the mediator, but the students can also mediate knowledge of other people within the activities. The mediator and student form a learning system, and what matters in this case, is the knowledge that emerges in this interaction.

2.3. SOCIAL MEDIATION BY CULTURAL SCAFFOLDING

Salomon and Perkins (1998) explain that when learners do not receive help from another agent who can adjust their needs, there could be some kind of intellectual partnership with artifacts like tools or information sources.

Such artifacts, or scaffoldings, include books, statistical tools, or shared symbol systems embodying. Artifacts are themselves culturally and historically situated, carrying the wisdom and hidden assumptions that went into their design, forming a learning system with the student, reorganizing action, and determining what can be carried out (SALOMON; PERKINS, 1998).

We can call artifacts, or scaffolding, the activities designed to implement the proposals in non-formal education spaces. In this case, the mediator's role is to provide and develop the artifacts, and when necessary, adjust the material to the students' needs. This type of mediation is directly related to the first type proposed by the authors since it deals with the work done by the teacher or monitor.

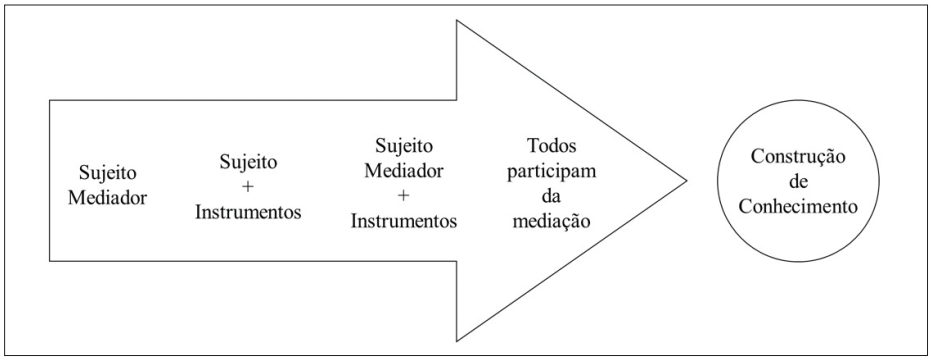
2.4. THE SOCIAL ENTITY AS A LEARNING SYSTEM

Social learning takes on a very different meaning when it comes to learning involving teams, organizations, cultures, and other collectives. "Here it is not necessarily the case that one agent is helping another to learn. Rather, the focus falls on a collective agency that, as a collective, acquires more knowledge, understanding, or skill, or a different climate or culture" (SALOMON; PERKINS, 1998, p 12).

In summary, "the group constitutes a collective learning system, a system that functions better or worse as a learner depending on how well its structures address critical conditions of learning" (SALOMON; PERKINS, 1998, p.12). In non-formal education spaces, often due to the lack of time for this learning system to be built, this type of mediation is not found because, in addition to time, it requires commitment from the group that is not possible in sparse activities (SALOMON; PERKINS, 1998).

Social mediation, presented in the four categories as proposed by Salomon and Perkins (1998), can be summarized in the following figure:

Figure 1. Scheme of the proposed mediation by Salomon and Perkins (1998)



Source: The authors.

According to the proposal presented, mediation starts from a mediating subject, it evolves to a subject that uses scaffolding, then to a mediating subject that uses scaffolding and allows the mediation to be carried out by others subjects, and finally to a level of independence in which all subjects participate in mediation and knowledge construction.

With the increase of this independence, the degree of the mediating subjects also increases. However, all processes can happen in the teaching spaces, some more than the others, and it is essential to emphasize that one level does not cancel the other. Among the activity proposals, the different levels may present their advantages depending on time, space, the number of subjects, learning needs, and educational objectives.

Given the theoretical framework presented, we here address the questions that led us to start this research. We analyzed the proposal and mediators reports of a non-formal education activity carried out in the university environment by mediators who are undergraduate and graduate students and presented the question "is it possible to find, in the reports of these mediators, se characteristics which approximate the mediation performed to the proposal of Salomon and Perkins (1998).

This question leads to the general objective of this research, which is to analyze aspects of monitors' mediation of a non-formal education activity. Specific objectives include: (i) to analyze how the monitors identify their role as a mediator in the project's actions and (ii) to analyze if and how the mediations proposed by Salomon and Perkins (1998) were developed by the mediators.

3. METHODOLOGICAL PROCEDURES

This research had a qualitative approach as it sought mediators of a university extension activity as the data source and the researchers as the primary analysis tool (BOGDAN; BIKLEN, 1994). We initially present the context of the project developed at a public university in the State of Paraná, in which the mediators acted as monitors and, later, the methodological procedures.

The New Talents Project is a university extension project that emerged in 2011 to offer workshops focused on the construction of knowledge, providing Basic Education students with the opportunity to understand natural science themes through experiments, plays, games, and other recreational activities, which approach non-formal education activities. Throughout this research, three editions of the workshops occurred. In two of them, the topics covered were Comparative Anatomy, Cell Biology and Histology, Neuroscience, Reproductive System and Sexuality, and Zoonoses. In the other workshop, the themes of the activities were Biotechnology and Microbiology, Botany, Drugs and Society, Physiology and Nutrition, and Zoology. Each workshop occurred on five Saturdays; primary education students were organized into five groups on the first day of the workshop, and each group went through a different workshop each week.

The workshops had two types of monitors: the workshops' permanent monitors (n=29) and the monitors who accompanied the students (n=10). The monitors participating in this research were the workshops' permanent monitors, as they not only prepared the activities but were also responsible for their development.

The 29 volunteer monitors were undergraduate and graduate students from biological, agricultural, and health programs, and were between 18 and 27 years old. Of these, eight participated in the project at least once when they were students of basic education, and 19 had already participated at least once as mediators. All participants in this research signed the Informed Consent Form (ICF).

The research involved what Chizzotti (2006) defines as a systematic collection of information, using a questionnaire and a semi-structured interview. We performed the analysis of the questionnaires and the interview through categorization (BARDIN, 2011). We organized the questionnaire data in Context Units and Registration Units *a posteriori*. We carried out the analysis of the interview in a fluctuating reading fluctuating, *i.e.,* we examined the interviewees' responses for characteristics of the categories proposed by Salomon and Perkins (1998), and allocated them into the categories elaborated *a priori*. The proposed categories were also composed of Registration Units (RU), which emerged *a posteriori* by reading the excerpts of the interviews. This process allowed us to discuss the questions that led to this research.

At first, the data were collected through an electronic questionnaire (Google Docs) and answered before the project activities started. From this questionnaire, two questions were used in this article: 1. *How do you define the monitor's role in the type of activity we perform?* (regarding the mediator's role in the project) and 2. *What is more important to take into account when preparing an activity for the project?* (involving aspects and criteria that the mediator considers important in the preparation of the material).

Subsequently, between the second and the fifth week of activities, interviews were conducted with sixteen mediators. We chose interviews as, according to Silveira (2002), they are a social interaction in which both the interviewer and the interviewee act in the production of knowledge. We can say that a survey that uses interviews is social interaction, in which the primary means of exchange are words.

We prepared the interview script according to each item proposed by Salomon and Perkins (1998). In Category 1, the mediator assists in the student's learning by forming a system with them. We proposed two questions: 1. *Choose an activity that you prepared and make an assessment of how it occurred. How do you evaluate this activity?* 2. *What did you do to help the students to understand the content? Did you have to act in different ways because the students are from different grades?*

Category 2 deals with the construction of knowledge as a participatory and collective process: 1. *Can you identify if the students learned? Explain how this happened.* 2. *Did the interaction between the students and in the relationship with the mediator serve as a vehicle for learning? Please explain.*

Category 3 addresses mediation through cultural scaffolding, i.e., the materials and activities prepared: 1. *How was preparing the activities?* 2. *What factors were taken into account when choosing the activities?*

The last category presented by the authors is not an analysis category as it involves a collective system, such as teams and large organizations, that builds learning over a longer time.

4. RESULTS AND DISCUSSION

We divided the results into two sections. In the first one, we present the discussion of data collected through electronic questionnaires, whereby we seek to obtain perceptions from mediators regarding their role and aspects related to the preparation of materials and activities carried out in the New Talents Project.

In the second section, we discuss the results of the data collected through the interviews, with which we seek to make comparisons to the proposals of Salomon and Perkins (1998), highlighting aspects of mediation.

5. ANALYSIS OF THE QUESTIONNAIRES

For the analysis of the electronic questionnaires, we listed two questions, and the answers allowed for the preparation of two Context Units (CU) and its Registration Units (RU).

5.1. CONTEXT UNIT (CU1): THE MEDIATOR'S ROLE

We organized this unit into four Registration Units (RU), which deal with perceptions about the role of the mediator in the activities offered by the New Talents Project, as shown in the table below.

Table 1. Registration Units of CU1

CU1. The Mediator's Role	
RU1.1. Transmitting or sharing knowledge, experiences	11 records
	It is essential that the monitor transmits knowledge to a student; not only scientific knowledge but also lived experiences. Besides, students feel closer and uninhibited when talking to the monitors **(M01)**
RU1.2. Contact with the university and the knowledge produced there	10 records
	The monitor is responsible for building a bridge that connects the scientific community with the community outside the university, taking the outcomes of scientific research to the students **(M09)**
RU1.3. Creates bonds, interacts and maintains contact with students	2 records
	This is critical, as the monitors make the project happen and they are the ones who interact with the students **(M20)**
RU1.4. Does not address the question	6 records
	Responsibility **(M21)**

Source: The authors.

In this context unit, mediators were expected to report their perception of the mediator's role in project activities. The results show that most of them believe that the mediator's role is to transmit content, knowledge, and to share experiences. We also noticed a naïve view that shared knowledge is ready, rather than built by the student. At this point, we consider these results negative, as this view of knowledge cannot be part of the mediator's speech. This type of speech often repeats the type of education they received in primary education and higher education.

Another significant group of subjects believes that their role is to be a point of contact with the university environment, bringing students closer to the university. Also, from this group, three of the mediators stated that one of the roles is to be a mediator between the student and the university. Knowing that university extension is one of the pillars of this educational institution, it is through these projects that focus on the social transformations of students, and through contact with mediators that they can discover a new environment, of which they are also entitled to be a part.

A smaller group of subjects declares that the mediator's role is to create bonds and have contact with the participating students, corroborating Gaspar (1993) when the author states that the mediator must be essential in the social interactions caused by him or that occur spontaneously, and prioritize dialogue and social interaction.

Although the results point out that the mediators understand their role in sharing the knowledge produced in the university environment, and being a point of contact between such knowledge and the students, we also observe a problem: we see that the concept of mediation is still far from those who perform it in practice, as this thinking of ready knowledge cannot be part of the mediator's vision.

5.2. CONTEXT UNIT 2 (CU2): ASPECTS FOR THE ELABORATION OF ACTIVITIES

We organized this unit in four RU, which address aspects that mediators take into account during the process of preparing an activity for the workshops. The table below shows sample responses for each Registration Unit.

Table 2. Registration Units of CU2

CU2. Aspects for the elaboration of activities	
RU2.1. Scientific content	11 records
	I believe that the most important thing is the relationship between the activity and the content covered in the workshops. Thus, the activities do not seem to have been carried out randomly to fill time, but rather with a clear teaching objective **(M17)**
RU2.2. Student-centered	10 records
	One should think about whether it is an activity that the student can understand taking into account their previous knowledge so that they can perform it, also trying, in some way, to make this activity fun to do **(M10)**
RU2.3. Methodology	6 records
	Think of didactic ways of explaining the contents worked on, using clear and easy to understand language, without leaving important information behind **(M22)**
RU2.4. Does not address the question	2 records
	Content assessment and class integration **(M16)**

Source: The authors.

In this unit, the mediators were expected to list aspects that they consider important when preparing activities that are developed with the students participating in the project.

The analysis of the answers shows that the majority of the mediators answersare allocated into RU2.1, as they state that scientific content is the most important aspect while raising other elements such as applicability and relevance of the content, whether it is present in the students' daily life, and if it is effective in understanding the contents. The second-largest group of responses (RU2.2) groups subjects who claim to report that aspects related to the student, such as previous knowledge, the ages, and grades of students, and applicability in their daily lives are the most important.

Taking into account the instruments and activities used in mediation, Registration Unit 2.2 corroborates what Carletti (2016) affirms when the author emphasizes that such instruments and activities should be thought and prepared considering the type of visitors (in this case, the participating students), their needs, and their interests so that mediation takes place satisfactorily.

The subjects grouped in Registration Unit 2.3 give greater importance to the methodology used in the activity, reporting the importance of creativity in the design of playful and interesting activities, as well as efficient ways of offering content to students, and using clear and easy to understand language. The results of

this unit corroborate some of the characteristics that Matsuura (2007) considers as important in the role of the mediator when the author affirms that they must know how to measure content, stimulate students' curiosity, and have a sense of play.

This group of responses still points to the mediators' content view, as they show great concern with the content and less concern with aspects related to the students' ability and the possibility of developing an activity that arouses critical thinking. It is not centered on the student and, as long as it is not the center of this activity preparation, mediation fails to be effective.

6. ANALYSIS OF INTERVIEWS

Here, we analyzed the data collected through the interviews carried out with a significant portion of the mediators, who were chosen according to criteria already presented in the methodology of this work.

The analysis allowed the *a posteriori* preparation of several Registration Units, which were allocated into Context Units established *a priori*, according to the categories proposed by Salomon and Perkins (1998).

6.1. CATEGORY 1 (C1) – ACTIVE SOCIAL MEDIATION OF INDIVIDUAL LEARNING

This category is supported by the explanations of Salomon and Perkins (1998) that deal with the acquisition of socially facilitated knowledge. Here we seek the relationship established by the mediator with the student, forming a learning system. Thus, the questions involved the evaluation of an activity mediated by the interviewee and by the mediators' reports regarding changes or adjustments that were made to facilitate mediation and, consequently, student learning.

We organized two registration units in this category. **RU 1: Mediation generating motivation in the student** had five records. Here is an excerpt from the M09 mediator's response:

> *[...] I think it was good, because the students showed much interest, we had a very good return. In the first week, some students came to say that they liked it a lot and I think that it was very good for some of them because it was their first contact with a microscope, they put their hands in the dough, got dirty with dye, I think it was really cool.*

The second context unit **RU 2: Mediation aimed at contextualization had** 12 records, addressing the mediator's concern in adapting the language to the public, as shown in the M18 excerpt:

> *And I moved more or less to their everyday vocabulary, without a very complicated word and when I spoke some complicated word I would explain more appropriately for them, in a manner they would understand and so on.*

In this category, the mediators were expected to provide answers that recognized themselves as subjects that enabled mediation. This perception was identified in both record units. In addition to this aspect, we observed that,

for these monitors, mediation prioritized participant motivation and activity contextualization.

The mediators demonstrated an incipient understanding that they are responsible subjects in the learning process, as there is no prior concern with the preparation of activities. Also, according to what was proposed by Salomon and Perkins (1998), it is possible to identify that there was mediation.

6.1. CATEGORY 2 (C2) – SOCIAL MEDIATION AS PARTICIPATORY KNOWLEDGE CONSTRUCTION

Salomon and Perkins (1998) also present learning as participation in a social process of knowledge construction. We seek to find, in the analyzed excerpts of the mediators' speech, relationships between the student-student and student-mediator interactions, and the learning provided through these interactions and mediation. From the analysis of the answers, three registration units were organized.

RU1: interaction that generates motivation, three records. Under this unit, monitors stressed the importance of collectivity to generate motivation among participants, as pointed out by M04:

> *Oh, I think so, especially when the module monitors have got to be more receptive to the student feeling free to ask. Because sometimes they have a question, but they are afraid to ask, so if they can't have this interaction between them, they don't feel comfortable, there is also this fear of asking. So I think it is important, sometimes one student ends up encouraging the other or, in a conversation between them, a question arises that sometimes would not arise before, and here comes the question, and then you can learn more.*

RU2: monitor-focused interaction, nine records. In this unit, the participants' responses were considered, indicating that the monitor was part of the collection of participants and monitor, as indicated by M19's speech:

> *They feel that the monitors are not teachers, they feel that the monitors are part of them, they are part of the class, so the approach is different from that in a classroom. I know because I am a teacher, so I see this difference a lot. So, in the way they feel free to ask us questions, they end up knowing a lot more things than if they were in a classroom because they have more freedom to ask.*

RU3: interaction between students obtained five records. In this unit, we selected the responses in which the monitors identified the role of mediation that occurs between the subjects throughout the activities, as explained by M17:

> *Among the students you can see a lot that they start discussing many times, sometimes they even disagree, or one says something, then the other says something that he thinks is a supplement, so I think that this discussion also helps them learn a little more.*

In this category, we expected the emergence of excerpts that point out to mediation as the construction of some new knowledge, collectively and socially realized. In the analysis, it was possible to infer that none of the mediators were

aware of this mediation proposed by Salomon and Perkins (1998), which deals with the construction of participatory knowledge. Mediators can identify the interaction that occurs between them and the students and among the students themselves. However, it still shows signs of unilateral mediation, and communication does not contribute to the construction of new knowledge.

6.3. CATEGORY 3 (C3) – SOCIAL MEDIATION BY CULTURAL SCAFFOLDING

Here we seek to understand the mediator's relationship with the scaffolding, also called the artifacts, which he expands for his activities. According to Salomon and Perkins (1998), the artifacts developed by the mediator form an intellectual partnership with the student, assisting their learning. For such purposes, the questions were related to the process of preparing the activities and factors used to choose the artifacts applied.

In this category, three registration units emerged. In **RU1: elaboration of an activity in a context other than school**, three responses were recorded, in which the monitors indicated that the objective in developing activities was to differentiate them from those of the school, as indicated by M23:

> *Try not to do much what they already do in the classroom, try to bring it in a different, more lively way (...) So, we tried to do it in a way that both the students and we could participate.*

In **RU2: elaboration according to the student**, there were three records and the monitors' responses were grouped, which indicated the concern with organizing products that students would identify and be interested in, as presented by M22:

> *Oh, it was like... "if I already had it as a student, would I like to have this?To have this activity?" And we tried as much as possible to escape the classroom environment, to avoid too much expository class because botany is a complicated subject for you to be giving a lot of content. So we thought: "If I were their age, would I understand it? Would you like to do, for example, activity outside the classroom, an expository class?*

The last recording unit contains the responses of 12 monitors. In **RU3: elaboration according to content**, we grouped the monitors' responses that indicated content prioritization when preparing activities, as stated by M04:

> *For the themes, we thought more about the university entrance exam, things that the entrance exam would include, so we thought they were important, because sometimes, for example, biomes are a theme that they see very little, and the entrance exam includes it. And we wanted to do fun things like that, so here comes an idea "oh, let's do chess", "oh, but chess is like this..." it was going, it was that brainstorm, you go on playing, each one gets something, and at the end of the day things become one.*

In this category, we expected to find, in the mediators' speeches, some characteristics that were considered important when preparing the materials or artifacts used during the activities of the New Talents Project.

The results demonstrate that the vast majority of mediators are restricted to content only at this point in the work, and were developing activities based on entrance exams, the volume, and absorption of the content.

The category strengthens the data from the initial questionnaire, which showed the distance that still exists between the view of mediation and the speech of the interviewed mediators. This distance presents a worrying situation: the vast majority of mediators take into account the content to develop the artifacts of the activities.

According to the references presented, for more effective mediation, the mediator must consider the student as the center of both planning and performance of activities, and most of the subjects' reports do not indicate this situation.

FINAL CONSIDERATIONS

This study aimed to analyze aspects related to mediation carried out in a non-formal education activity. More specifically, we analyzed how the monitors identified their role as mediators and whether the mediations proposed by Salomon and Perkins (1998) were developed. The theoretical framework relied on aspects related to non-formal education spaces, mediation and mediators, and the mediation proposal by Salomon and Perkins (1998).

The analysis of the data obtained in the questionnaires, collected before the beginning of the activities, showed that the perception of the mediators is very distant from the idea of mediation and that the mediators are still very focused on the specific content and the proposal of teaching that content.

Regarding the analysis of the mediator's role, most of the results show that it is the mediator's role to transmit the content. It also presents anaïve view that the shared knowledge is ready and finished, rather than an individual construction of each student. We can consider this a negative result as this type of thinking cannot be present in the mediator's discourse, which often repeats the teaching he received during his training. Results also show the mediator's role is as a point of contact between the university and the participants of the activity.

We still consider that, even if there is no reference to the mediation in the subjects' discourse, we can infer that the mediators do not see themselves as facilitators of the learning process and knowledge construction.

Regarding the analysis of aspects taken into account during the preparation of the activities, results continue to be related to the content, even those that point out the importance of methodology or aspects involving the student. Here we identify again that the mediators have a content-focused view. In the construction of the workshop, they were concerned with its content and the quantity, and less emphasis on other aspects related to the participants, such as arousing their curiosity and interest in science. As long as the student is not the center of planning, mediation fails to be effective.

In the analysis of the interviews carried out after the first week of activities, we grouped the results in the categories proposed by Salomon and Perkins (1998). As for the active social mediation of individual learning, we found speeches mentioning the student-motivating mediation and mediation aimed at contextualization. We can infer that the mediators perceive the need to adapt the

activities according to the students. However, we noted that this perception is still superficial, and it only appeared when performing the activities. Nevertheless, to promote mediation more effectively, such perception should have occurred at the time of planning.

Here, a concern emerged: since they do not have this previous perception, the mediators are worried only with the activity and not with the process as a whole. Even so, it is possible to identify that there was mediation and that the interviewees perceive themselves as responsible for learning, differing from the data presented in the electronic questionnaires.

Additionally, we found that none of the mediators fits Salomon and Perkins' (1998) proposal when it comes to social mediation as the construction of participatory knowledge. Even being able to identify the interactions, the mediators still show signs of unilateral mediation and, therefore, of non-contribution to the interaction for the construction of new knowledge.

Regarding mediation supported by scaffolding, although they consider it important to differentiate themselves from the school context, most mediators are restricted to content only when preparing materials, based on their volume and depth, and also on the content that is important for the students' future entrance exams.

Noteworthily, the project's activity proposal lacked discussions and instructions, enabling the mediators to understand the potential of mediation in activity preparation and development. Mediation should already be part of the objectives established for projects like the one studied in this work since an important part of the projects in non-formal education spaces is to approach scientific knowledge in a manner other than the content and transmission-focused conception, which is still present in many schools.

Also, this study demonstrated that students from different courses are interested in extension activities, whose preparation becomes important as the curricula of many university programs fail to include this type of training. A brief review of the subjects' program schedules showed that none of them include courses related to university extension. This fact allows us to infer that the subjects do not have a specific preparation for extension activities throughout their programs. Therefore, there is a need for new research that, in addition to identifying mediators' perceptions, provides them with instructional opportunities.

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